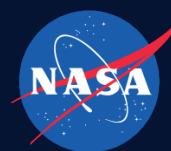


Environmentally Responsible Aviation Project

Aeronautics Research Mission Directorate (ARMD)



ABSTRACT

Created in 2009 as part of NASA's Aeronautics Research Mission Directorate's Integrated Systems Research Program, the Environmentally Responsible Aviation (ERA) Project explores and documents the feasibility, benefits and technical risk of vehicle concepts and enabling technologies to reduce aviation's impact on the environment.

ANTICIPATED BENEFITS

To NASA funded missions:

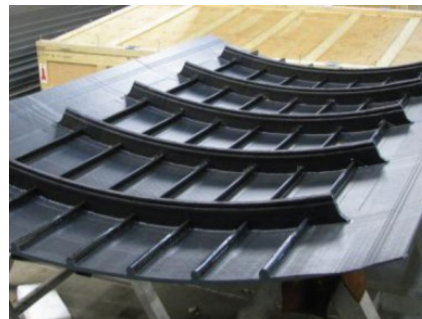
The results of this project will reduce the emissions, noise, and fuel consumption of aircraft.

To the nation:

The results of this project will reduce the emissions, noise, and fuel consumption of aircraft.

DETAILED DESCRIPTION

Created in 2009 as part of NASA's Aeronautics Research Mission Directorate's Integrated Systems Research Program, the Environmentally Responsible Aviation (ERA) Project explores and documents the feasibility, benefits and technical risk of vehicle concepts and enabling technologies to reduce aviation's impact on the environment. Current-generation aircraft already benefit from the NASA investments in aeronautical research that have improved fuel efficiencies, lowered noise levels and reduced harmful emissions. Although substantial progress has been made, much more needs to be done. Forecasts call for the nation's air transportation system to expand significantly within the next two decades. Such an expansion could bring adverse environmental impacts. To neutralize or reduce these impacts is the goal of the ERA Project and its focused research. The project is organized to:

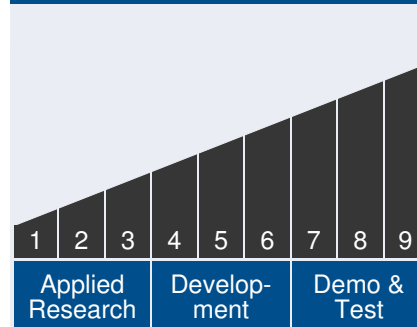


Large curved panels made of damage-tolerant composite (nonmetallic) materials are being tested for future use in new aircraft shapes

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Technology Maturity



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- Mature promising technology and advanced aircraft configurations that meet mid-term goals — in the next five to 10 years — for community noise, fuel burn and nitrogen oxides (NOx) emissions as described in the National Aeronautics Research and Development Plan and;
- Determine the potential impact of these advanced aircraft designs and technologies if successfully implemented into the air transportation system.

Management Team

Program Director:

- Edgar Waggoner

Project Manager:

- Fayette Collier

Research Challenges

To enable advanced aircraft configurations that might enter service by 2025, the ERA Project is working on technologies that will simultaneously:

- Reduce aircraft drag by 8%
- Reduce aircraft weight by 10%
- Reduce engine specific fuel consumption by 15%
- Reduce oxides of nitrogen emissions of the engine by 75%
- Reduce aircraft noise by 1/8 compared with current standards.

Organization

The ERA Project is comprised of three subprojects: Airframe Technology, Propulsion Technology and Vehicle Systems Integration. Work within the project is coordinated with system-level research performed by other programs within NASA's Aeronautics Research Mission Directorate as well as other federal government agencies.

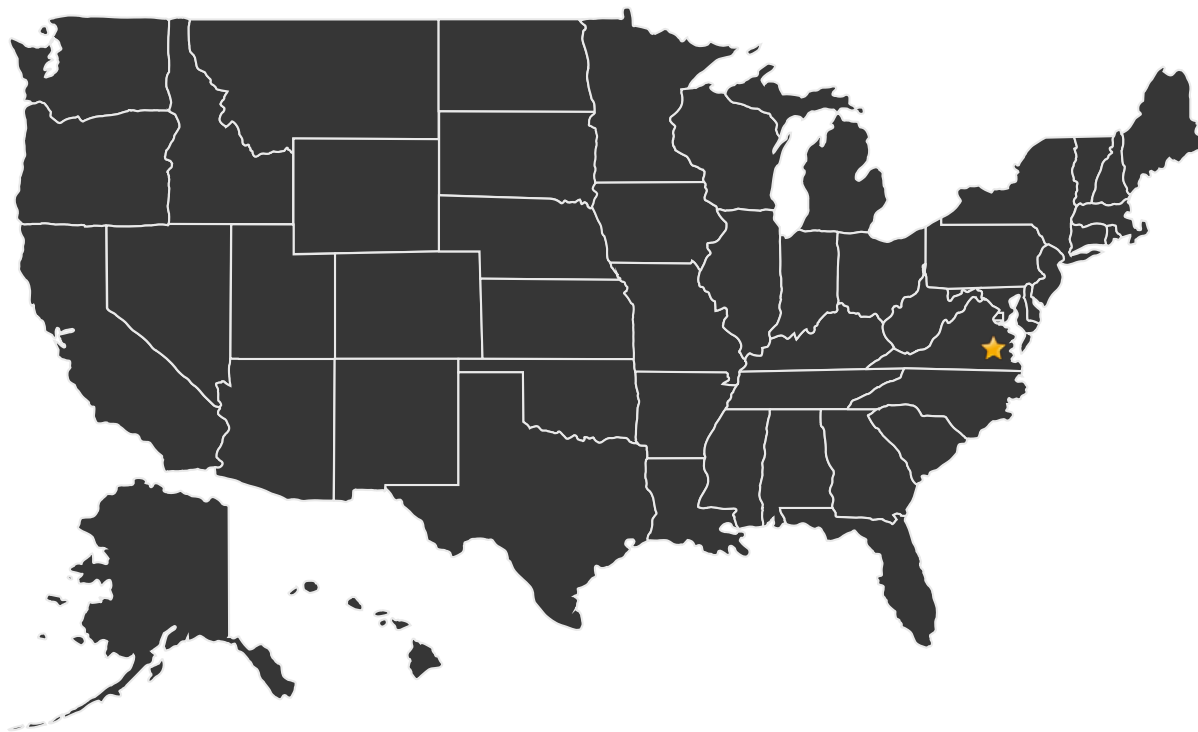
NASA has also put mechanisms in place to engage academia and industry, including working groups and technical interchange meetings; Space Act Agreements for cooperative partnerships; and the NASA Research Announcement process that provides for full and open competition for the best and most promising research ideas. The ERA Project disseminates all of its research results to the widest practical extent.

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U.S. LOCATIONS WORKING ON THIS PROJECT



■ U.S. States With Work

★ **Lead Center:**
Langley Research Center

DETAILS FOR TECHNOLOGY 1

Technology Title

Demonstrate Advanced Ultra-high Bypass (UHB) Engine Designs for Specific Fuel Consumption and Noise Reduction

Technology Description

This technology is categorized as a hardware subsystem for manned flight

Demonstrate UHB efficiency improvements to achieve 15% reduction in thrust specific fuel consumption, contributing to the 50% fuel burn reduction goal at the aircraft system level, while reducing engine system noise and minimizing weight, drag, NOx, and integration penalties at aircraft system level

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Capabilities Provided

This technology will help reduce aircraft fuel consumption and noise.

Potential Applications

This is one of many research efforts to develop technologies to make aircraft safer, faster, and more efficient and to help transform the national air transportation system.